

REMARKS

1. Claims 1-16 are pending and stand rejected.

Reconsideration of this application is respectfully requested.

2. Claims 1-7 and 10-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 7,006,205 to Agarwal et al. (Agarwal) in view of U.S. Patent 6,024,831 to Hwang et al. (Hwang).

Under 35 U.S.C. 103(a), a claim is unpatentable for obviousness when the “subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains.” Whether the subject matter of a claim is obviousness is based on the following factual inquiries: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the prior art and the claimed invention; and (4) the extent of any objective indicia of non-obviousness. Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966). According to the MPEP, in order to establish a prima facie case of obviousness, the Examiner has the initial burden of establishing, with factual support, three basic criteria: (1) some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) a reasonable expectation of success; and (3) the prior art reference (or references when combined)—and not the Applicant’s disclosure—must teach or suggest all the claim limitations. MPEP 2142. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the [E]xaminer must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

It is respectfully submitted that the Examiner has not established a prima facie case of obviousness because there is no suggestion or motivation to modify Agarwal with the teachings

of Applicant's "BACKGROUND OF THE INVENTION" (background section), and Agarwal in view of Hwang (and Applicant's background section) fail to teach or suggest all the claim limitations.

Claims 1 and 11 are independent are directed to a method of in situ monitoring of particles generated by a reaction by-product film peeling from an interior wall of a reaction chamber of a semiconductor fabrication apparatus to determine reaction chamber condition. The method of claim 1 calls for,

exciting the particles generated by the reaction by-product film peeling from the interior wall of the reaction chamber of the semiconductor fabrication apparatus to emit light, the emitted light having a predetermined wavelength associated with the particles;

measuring intensity values of the light emitted at the predetermined wavelength over a predetermined time period; and

comparing the intensity value of the light, measured at a selected time during the predetermined time period, to a predetermined light intensity threshold value wherein if the intensity value of the light measured at the selected time is above the predetermined light intensity threshold value, the chamber condition is abnormal.

and the method of claim 11 calls for,

exciting the particles generated by the reaction by-product film peeling from the interior wall of the reaction chamber of the semiconductor fabrication apparatus to emit light; and

comparing an intensity value of the light, measured at a selected time during a predetermined time period, to a predetermined light intensity threshold value.

In contrast Agarwal teaches a method and system for monitoring the plasma process to stop the plasma process (e.g., etching or deposition) at the correct time. Agarwal does not describe a method of in situ monitoring of particles generated by a reaction by-product film

peeling from an interior wall of a reaction chamber of a semiconductor fabrication apparatus to determine reaction chamber condition, as called for in claims 1-7 and 10-16.

The Examiner recognizes this deficiency and attempts to rectify the same by modifying Agarwal with Applicant's background section. In so doing, the Examiner states that "[i]t would have been obvious . . . to combine Agarwal et al's method in situ monitoring of particles with particles generated by the reaction by product film peeling from the interior wall of the reaction chamber of the semiconductor fabrication apparatus as taught by Background of the Present Invention for the purpose of performing a maintenance cleaning on the chamber to remove the adhering peeling film and monitoring the concentration of particles in the reaction chamber."

The Examiner's proposed modification of Agarwal with Applicant's background section fails to arrive at a method for monitoring particles generated by a reaction by-product film peeling from the interior wall of a reaction chamber of a semiconductor fabrication apparatus, as argued by the Examiner. Agarwal merely teaches a method and system for monitoring the plasma process for the purpose of stopping the plasma process (e.g., etching or deposition) at the correct time. Applicant's background section merely suggests that Agarwal's plasma process can be negatively effected by a reaction by-product film peeling from the interior wall of the Agarwal reaction chamber. Hence, Agarwal in view of the Applicant's background section does not teach or suggest a method for monitoring particles generated by a reaction by-product film peeling from the interior wall of a reaction chamber of a semiconductor fabrication apparatus.

In addition, there is no motivation in either Agarwal or Applicant's background section for modifying Agarwal's method and system to monitor particles generated by a reaction by-product film peeling from the interior wall of Agarwal's reaction chamber. The Examiner's reason for making such a modification, i.e., ". . . monitoring the concentration of particles in the reaction chamber" clearly comes from Applicant's disclosure. Neither Agarwal nor Applicant's background section teaches or suggests the desirability of exciting the by-product film particles in the Agarwal reaction chamber to monitor the concentration of the same, except Applicant's own invention disclosure.

Hwang fails to cure the deficiencies of Agarwal (and Applicant's background section), as Hwang merely teaches a method and apparatus for monitoring the condition of a plasma using a spectrum detector that detects the intensity of a predetermined wavelength of radiation produced by the plasma process and a parameter calculator that calculates a parameter such as velocity or acceleration of the intensity and compares the parameter to a predetermined threshold. Hwang does not teach or suggest a method for monitoring particles generated by a reaction by-product film peeling from the interior wall of a reaction chamber of a semiconductor fabrication apparatus, as required by claims 1-7 and 10-16.

Hence, claims 1-7 and 10-16 are allowable over Agarwal in view of Hwang (and Applicant's background section).

In view of the foregoing, withdrawal of this rejection is respectfully urged.

Claims 8 and 9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal in view of Hwang as applied to claims 1 and 7 above, and further in view of U.S. Patent 6,815,362 to Wong et al. (Wong).

Claims 9 and 8 include the features of respective claims 1 and 7. As discussed above, Agarwal in view of Hwang (and Applicant's background section) fail to teach or suggest the subject matter now recited in independent claims 1 and 7. Wong fails to cure the deficiencies of Agarwal in view of Hwang (and Applicant's background section), as Wong is only concerned with determining an endpoint of an in-situ cleaning process of a semiconductor processing chamber, and not with in situ monitoring of particles generated by a reaction by-product film peeling from an interior wall of a reaction chamber of a semiconductor fabrication apparatus to determine reaction chamber condition, as claimed. Thus, claims 8 and 9 are allowable over Agarwal in view of Hwang (and Applicant's background section) and further in view of Wong.

In view of the foregoing, withdrawal of this rejection is respectfully urged.

Favorable reconsideration of this application is respectfully requested as it is believed that all outstanding issues have been addressed herein and, further, that claims 1-16 are in

condition for allowance. Should there be any questions or matters whose resolution may be advanced by a telephone call, the examiner is cordially invited to contact applicants' undersigned attorney at his number listed below.

The Commissioner is authorized to charge any payment required under 37 CFR 1.16 and any patent application processing fees under 37 CFR 1.17, which are associated with this paper, or credit any overpayment to Deposit Account No. 04-1679.

Respectfully submitted,



PAUL A. SCHWARZ
Registration No. 37,577

Duane Morris LLP
P.O. Box 5203
Princeton, New Jersey 08543
(609) 631-2446 - telephone
(609) 631-2401 - facsimile